

WHAT IS CLAIMED IS:

1. An electromagnetic switch device for star-delta connections comprising:

5 a body;

three power terminals arranged at one side of the body and respectively connected to three-phase power lines, the power terminals being insulated from one another;

10 three main starting terminals arranged at the other side of the body and respectively connected to one-side terminals of a three-phase electric motor, the main starting terminals being insulated from one another;

15 three star-delta terminals arranged at the other side of the body outside the main starting terminals and connected to the other-side ends of the three-phase electric motor, respectively, the star-delta terminals being insulated from one another;

20 an electromagnet for a main circuit and an electromagnet for star-delta connections disposed a lower portion of the body in such a fashion that they are laterally aligned with each other while being insulated from each other, each of the electromagnets including a fixed core and a coil wound around the fixed core;

25 a main circuit switching unit arranged near the main circuit-end electromagnet in the interior of the body, the main

circuit switching unit serving to selectively connect each of the main starting terminals to an associated one of the power terminals in accordance with a magnetization of the main circuit-end electromagnet; and

5 a star-delta connection switching unit arranged near the star-delta connection-end electromagnet in the interior of the body, the star-delta connection switching unit serving to selectively connect the star-delta terminals to one another or to the main starting terminals, respectively, in accordance with a magnetization of the star-delta connection-end electromagnet.

10 2. The electromagnetic switch device in accordance with claim 1, further comprising:

15 a timer arranged in the interior of the body and adapted to count an activation time of the main circuit-end electromagnet, thereby determining a point of time when the star-delta connection-end electromagnet is to be activated.

20 3. The electromagnetic switch device in accordance with claim 1, further comprising:

25 isolating plates arranged between adjacent ones of the power terminals, between adjacent ones of the main starting terminals, and between adjacent ones of the star-delta terminals to isolate the adjacent power terminals, the adjacent main starting terminals, and the adjacent star-delta terminals,

respectively.

4. The electromagnetic switch device in accordance with claim 1, wherein the main circuit switching unit comprises:

5 a moving core vertically movable in accordance with a magnetization of the main circuit-end electromagnet;

a vertical moving member integrally coupled to the moving core in such a fashion that it is moved along with the moving core;

10 three pairs of fixed contacts arranged at desired positions within a vertical movement zone of the vertical moving member in such a fashion that the fixed contacts included in each of the fixed contact pairs are disposed at opposite sides of the vertical moving member, respectively, the fixed contacts arranged at one side of the vertical moving member being connected to the power terminals, respectively, while being insulated from one another, and the fixed contacts arranged at the other side of the vertical moving member being connected to the main starting terminals, respectively, while being insulated 15 from one another; and

20 three pairs of moving contacts mounted to the vertical moving member in such a fashion that the moving contacts included in each of the moving contact pairs are disposed at opposite sides of the vertical moving member, respectively, the moving contacts arranged at one side of the vertical moving

member being insulated from one another, the moving contacts arranged at the other side of the vertical moving member being insulated from one another, and the moving contacts being vertically moved in accordance with a vertical movement of the vertical moving member, so that they selectively come into contact with respective associated ones of the fixed contacts, thereby causing the power terminal-end fixed contacts to be selectively connected to the starting terminal-end fixed contacts.

5. The electromagnetic switch device in accordance with claim 1, wherein the star-delta connection switching unit comprises:

10 a moving core vertically movable in accordance with a magnetization of the star-delta connection-end electromagnet;

15 a vertical moving member integrally coupled to the moving core in such a fashion that it is moved along with the moving core;

20 three pairs of fixed contacts for star-dm / -del(.. connection arranged at desired positions within a vertical movement zone of the vertical moving member in such a fashion that the fixed contacts included in each of the fixed contact pairs are disposed at opposite sides of the vertical moving member, respectively, the fixed contacts arranged at one side of the 25 vertical moving member being connected to the main starting

terminals, respectively, while being insulated from one another, and the fixed contacts arranged at the other side of the vertical moving member being connected to the star-delta terminals, respectively, while being insulated from one another;

5 three pairs of moving contacts for delta connection mounted to the vertical moving member in such a fashion that the moving contacts included in each of the moving contact pairs are disposed at opposite sides of the vertical moving member, respectively, the moving contacts arranged at one side of the vertical moving member being insulated from one another, the moving contacts arranged at the other side of the vertical moving member being insulated from one another, and the moving contacts being vertically moved in accordance with a vertical movement of the vertical moving member, so that they selectively come into contact with respective associated ones of the fixed contacts, thereby causing the star-delta connection-end fixed contacts to be selectively connected to the starting terminal-end fixed contacts so as to achieve a delta connection; and

20 three moving contacts for star connection mounted to the vertical moving member at a position vertically shifted from the delta connection-end moving contacts near the star-delta connection-end fixed contacts, the star connection-end moving contacts being short-circuited together, and the star connection-end moving contacts being vertically moved in accordance with a vertical movement of the vertical moving

member, so that they selectively come into contact with respective associated ones of the fixed contacts, thereby causing the fixed contacts to be selectively connected together so as to achieve a star connection, the star connection by the 5 star connection-end moving contacts being achieved when the delta connection by the delta connection-end moving contacts is released.

10 6. The electromagnetic switch device in accordance with claim 4 or 5, further comprising:

a return springs adapted to provide a return force for returning the vertical moving member to an original position thereof at which the moving contacts are separated from respective associated ones of the fixed contacts.

15 7. The electromagnetic switch device in accordance with claim 4 or 5, further comprising:

an arc prevention spring arranged in the vertical moving member and adapted to always urge the me mov contacts toward the 20 fixed contacts, thereby increasing the contact force of the moving contacts when the moving contacts come into contact with the fixed contacts, so as to suppress generation of arc at regions where the moving contacts come into contact with the fixed contacts, respectively.